

REMARKS

Claims 1-18 were presented with the application as filed on May 3, 2006. In a concurrently filed Preliminary Amendment, Applicants amended claims 10, 11, and 13. In a Preliminary Amendment submitted on February 22, 2007, Applicants amended claims 6, 17, and 18, and added new claims 19-24. In their September 15, 2009 Response to a Non-Final Office Action, Applicants canceled claims 4 and 19, and amended claims 1, 3, 6-8, 10-12, 14-18, and 20-24. Currently, Applicants amend claims 1 and 14. Claims 1-3, 5-18, and 20-24 are pending. Reconsideration of the application and allowance of all claims pending herein are respectfully requested in view of the remarks below.

Objections to the Claims

Claims 14-18 and 21-24 are objected to because of the following informalities: “°C” should be “°C-” and in the last line ‘said solution’ should recite which it refers to the one in (b) or the one in (d). Applicants have amended claim 14 to correctly recite “°C”, and to clarify that in part (e), “said solution” is “from step (d)”. The Action states that claims 14-18 and 21-24 appear allowable over the cited prior art of record. Claim 14 is independent and the remaining objected-to claims ultimately depend therefrom. As such, Applicants respectfully submit that in view of the instantly-made amendments to claim 14, the objection to claims 14-18 and 21-24 has been overcome, and the claims are in condition for allowance.

Rejections under 35 U.S.C. § 112

The Office Action rejects claims 1-3, 5-13, and 20 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the rejection asserts that:

The claims(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1, “at a temperature of 195 to 270 °C” is new matter because instant Figs 1-3 only support this temperature range for a feed of copper-iron-sulfur material in an autoclave which is not required by instant claim 1.

Applicants currently amend claim 1 to recite “A method for leach extraction of copper-iron-sulfur feed material ~~mineral bearing ores and concentrates~~ including the step of leaching said ~~material~~ mineral ...in an autoclave...” The Office Action states that the temperature limitation “at a temperature of 195 to 270 °C” is only supported “for a feed of copper-iron-sulfur material in an autoclave which is not required by instant claim 1.” Claim 1 has thus been amended consistent with the statement in the Office Action. In addition to the statement in the Office Action, this amendment is also supported by, *inter alia*, Figures 1-3, and paragraphs [0046], [0061], and [0065] of Applicants’ published application.

Claim 1 is independent and claims 2-3, 5-13, and 20 ultimately depend therefrom and add limitations thereto. Applicants respectfully submit that, as amended, the claims satisfy the written description requirement, and do not include new matter. Withdrawal of the rejection under 35 U.S.C. § 112, first paragraph is respectfully requested.

Rejections under 35 U.S.C. § 103

The Office Action rejects claims 1-3, 5-13, and 20 under 35 U.S.C. § 103(a) as being unpatentably obvious over Swinkels (U.S. Patent No. 4,049,770) in view of Collins (U.S. Patent No. 5,730,776). In particular, the Action asserts that:

Swinkels suggests the instantly claimed process of leaching iron containing copper sulfides with a pressure oxidizing acid leach solution of sulfuric acid at a temperature of 200-250 °C in which basic ferric sulfate is formed therein. See col. 10.

Swinkels may differ in that chalcocite is not stated.

Collins teaches a similar pressure oxidation sulfuric acid leaching process wherein chalcocite is treated at temperatures as high as about 220 °C. See cols. 5, 6.

It would have been obvious to one skilled in the art to treat the chalcocite of Collins in the process of Swinkels because each is drawn to a similar leaching process for copper recovery from iron containing ore.

This rejection is respectfully traversed for the following reasons.

The Office Action cites to column 10 of Swinkels to support the assertion that the reference discloses mineral leaches at 200-250 °C. However, for the actual mineral leach,

Swinkels teaches use of lower temperatures, not to exceed the melting point of sulfur, which is about 118 °C¹. Before reaching the procedure in column 10, Swinkels has already performed an acid oxidation mineral leach, and has actually performed a pelletization step on the discharge slurry, pelletizing nearly all of the sulfur in the mix to an elemental sulfur product, which is desirable because it “is stable and relatively inert and thus suitable for storage or shipment” (see col. 10, lines 3-19; col. 5, lines 10-43). The column 10 process that the Office Action mentions employs temperatures of 200-250 °C, but is performed on what is left *after* most of the sulfur has been removed from the slurry and pelletized – namely “the slimes and filtercake from filtration.” A person having ordinary skill in the art would thus have no reason, and would actually be dissuaded from using the high temperatures used on Swinkels’ leftover “slimes and filtercake” for the actual mineral leaching, which Swinkels emphasizes cannot be performed at temperatures in excess of the melting point of sulfur (see, *e.g.*, col 8, lines 46-50: “The upper limiting temperature thus is that temperature at which elemental sulfur melts, i.e. 113 °C to 119 °C”).

Further, unlike the instantly claimed method (mineral leaching at 195-270 °C), in Swinkels’ method, a mineral concentrate is fed to an acid leach where it is mixed with a solution containing free sulfuric acid, preferably at 30-100 °C (see Swinkels col. 4, lines 36-47). Swinkels reports that temperature is not critical within the preferred range, but cautions that temperatures in excess of 100 °C decreases the solubility of FeSO₄ (see col. 4, lines 59-63), thus teaching away from Applicants’ method and the claimed temperature limitation.

Moreover, unlike Applicants’ method, which utilizes the basic ferric sulphate precipitate that is formed, Swinkels cautions that “[t]he acidity of the reaction mixture in the oxidation leach is critical and must be carefully controlled to ... prevent the precipitation of iron compounds” (see col. 9 lines 26-29). It is only Swinkel’s process performed on the “slimes and filtercake” (rather than the process for the actual mineral leach) that results in basic ferric sulfate, and instead of reacting the little basic ferric sulfate with excess sulfuric acid as recited in the instant claims, Swinkels redissolves his iron products, and neutralizes any excess free acid with CaO (see col. 10, lines 31-32; and col. 11, line4-6). The Swinkels method therefore fails to meet the

¹ See, *e.g.*, “Sulfur”, ChemicalElements.com (available at <http://www.chemicalelements.com/elements/s.html>) (last accessed June 22, 2010).

temperature limitation in Applicants' claims, and does not include an aqueous stream comprising a solution formed by reaction of basic ferric sulphate with excess sulfuric acid. Instead of Applicants' production of basic ferric sulfate at high temperatures, Swinkels discusses an "integrated production of elemental sulfur" (see col. 6 lines 19-21). Further, unlike Applicants' method, which utilizes excess sulfuric acid, Swinkels discusses the undesirability of the sulfuric acid generated in his process, and indicates that ferric ions should be kept to a minimum to avoid production of excess acid (see col. 7, lines 11-16).

Swinkels does not teach all of the instant claim limitations, and, as summarized above, actually teaches away from them. A person having ordinary skill in the art would not combine Swinkels with Collins because Swinkels emphasizes that the oxidative mineral leach must be performed at temperatures *below* the melting point of sulfur, whereas Collins' method is carried out preferably at temperatures *above* the melting point of sulfur but below about 200 °C (see Collins' Abstract). Even if a person having ordinary skill in the art were to combine Swinkels and Collins, the result would not include all of Applicants' claim limitations. Collins indicates a desire to minimize basic ferric sulfate formation, and teaches that temperatures above 200 °C are not recommended because they result in basic ferric sulfate precipitation. Indeed, neither of the references teaches Applicants' temperature limitation or an aqueous stream comprising a solution formed by reaction of basic ferric sulphate with excess sulfuric acid. On the contrary, both references teach away from high temperatures, and teach that basic ferric sulphate precipitation product is undesirable. It is respectfully urged that Swinkels and Collins certainly cannot be considered to provide a reason for *utilizing* an undesirable product.

As discussed above, the deliberate formation of basic ferric sulphate in a high temperature autoclave process followed by leaching and application of the ferric sulphate to chalcocite leaching are not present in Swinkels or Collins, or in the combination of the two references (even though, as indicated *supra*, a skilled artisan would not combine the two references). In fact, Swinkels teaches the use of an SO₂ enhanced atmospheric leach to reductively leach the iron precipitates away from remaining values in the residue. This reductive treatment would necessarily convert basic ferric sulphates or hematite into ferrous sulphate, which would not have any application in the further oxidative leaching of chalcocite or other

species. Moreover, the Swinkels process that the Office Action cites to is performed on the leftover “slimes and filtercake”, so Applicants’ instant claim amendment reciting “copper-iron-sulfur feed material” is also not met.

In view of the foregoing, it is respectfully submitted that claims 1-3, 5-13, and 20 are not obvious over Swinkels in view of Collins. Withdrawal of the 35 U.S.C. § 103(a) rejection is therefore respectfully requested.

The fees for a three-month extension of time and a Request for Continued Examination are submitted herewith. No additional fees are believed due. However, the Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment to Deposit Account No. 08-1935, Reference No. 1510.011.

There being no other outstanding issues, it is believed that the application is in condition for allowance, and such action is respectfully requested.

If a telephone conference would be of assistance in advancing the prosecution of the subject application, Applicants’ undersigned attorney invites the Examiner to telephone her at the number provided.

Respectfully submitted,

A handwritten signature in black ink, reading "Erica M. Hines". The signature is written in a cursive, flowing style.

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Dated: June 24, 2010

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